1		DIRECT TESTIMONY
2		OF
3		JOSEPH M. LYNCH
4		ON BEHALF OF
5		SOUTH CAROLINA ELECTRIC & GAS COMPANY
6		DOCKET NO. 2008-196-E
7		
8	Q.	PLEASE STATE YOUR NAME, BUSINESS ADDRESS AND CURRENT
9		POSITION WITH SOUTH CAROLINA ELECTRIC & GAS COMPANY
10		("SCE&G" OR "COMPANY").
11	A.	My name is Joseph M. Lynch and my business address is 1426 Main
12		Street, Columbia, South Carolina. My current position with the Company is
13		Manager of Resource Planning.
14		
15	Q.	DESCRIBE YOUR EDUCATIONAL BACKGROUND AND
16		PROFESSIONAL EXPERIENCE.
17	A.	I graduated from St. Francis College in Brooklyn, New York with a
18		Bachelor of Science degree in mathematics. From the University of South
19		Carolina, I received a Master of Arts degree in mathematics, an MBA and a
20		Ph.D. in management science and finance. I was employed by SCE&G as a
21		Senior Budget Analyst in 1977 to develop econometric models to forecast
22		electric sales and revenue. In 1980, I was promoted to Supervisor of the Load
23		Research Department. In 1985. I became Supervisor of Regulatory Research

where I was responsible for load research and electric rate design. In 1989, I became Supervisor of Forecasting and Regulatory Research, and, in 1991, I was promoted to my current position of Manager of Resource Planning.

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Q. WHAT ARE YOUR CURRENT DUTIES AS MANAGER OF RESOURCE PLANNING?

As Manager of Resource Planning I am responsible for producing SCE&G's forecast of energy, peak demand and revenue; for developing the Company's generation expansion plans; and for overseeing the Company's load research program.

A.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

The purpose of my testimony is to discuss the Company's projected load growth over the next fifteen years and to sponsor and explain the studies conducted by SCE&G that establish the need for additional base load generation in the 2016 time period. I further discuss SCE&G's analysis of the relative economics and feasibility of nuclear and non-nuclear generation and why nuclear is the preferable generation option at this time.

I will testify concerning the Company's analysis of the need for capacity and the contribution that the proposed facilities will make to the economy and reliability of SCE&G's system which are included as Exhibits G and H to the

1		Combined Application in this proceeding. I have included copies of these
2		documents as exhibits to my testimony which are identified as follows:
3 4 5 6 7 8 9		Exhibit G (Exhibit No (JML-1)), Forecast Need for Electric and Fuel Type. Exhibit H (Exhibit No (JML-2)), Contribution to System Efficiency and Fuel Type.
10		I have also included as exhibits to my testimony copies of three
11		additional documents which are as follows:
12 13 14 15 16 17 18 19 20		Exhibit No (JML-3), SCE&G Summer Peak Demands (MW). Exhibit No (JML-4), SCE&G Territorial Sales (GWH). Exhibit No (JML-5), Mean Annual Wind Speed of South Carolina at 70 Meters.
21	Q.	HAS SCE&G CONDUCTED ANY STUDIES PROJECTING ITS
22		ENERGY AND PEAK DEMAND GROWTH OVER THE NEXT
23		FIFTEEN YEARS?
24	A.	Yes, every year in accordance with S.C. Code Ann. § 58-37-40 and
25		Commission Order No. 98-502, SCE&G files an Integrated Resource Plan
26		("IRP") for meeting the future energy needs of its customers. The most recent
27		IRP demonstrating these forecasts over the next fifteen years, 2008 through
28		2022, was filed with the Commission on February 28, 2007, in Docket No.
29		2006-103-E. Subsequently, the Company revised its IRP by filing a revised
30		plan on May 28, 2008.

Q. BASED ON THESE STUDIES, WHAT PEAK DEMAND GROWTH DOES SCE&G PROJECT FOR THE NEXT FIFTEEN YEARS?

Over the past fifteen years, SCE&G's retail portion of its peak demand has grown approximately 2.4%, or about 96.4 megawatts ("MW"), per year. SCE&G currently anticipates that the future growth on its retail peak demand will be comparable to its historical experience and will grow at approximately 2.0%, or 112.1 MW, per year over the next fifteen years. With respect to total territorial peak load, the Company has historically experienced a growth rate of 2.5% per year. However, SCE&G projects that its firm territorial summer peak demand and winter peak demand will grow only 1.7% per year. The projected reduction in the level of growth is the result of the forthcoming loss of the City of Orangeburg as a customer in May 2009 and the expected loss of two other wholesale customers before 2010. As shown in Exhibit No. __ (JML-3), the loss of these customers will reduce the Company's wholesale load from 302 MWs in 2007 to 39 MWs in 2010.

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Q. DID SCE&G TAKE THESE WHOLESALE CONTRACTS INTO CONSIDERATION WHEN IT DETERMINED ITS CAPACITY NEEDS?

Yes. When SCE&G signed contracts with these entities a few years ago, SCE&G anticipated that it would need additional capacity in 2009. The Company, therefore, limited the term of the contracts so that they would expire

during the 2009-2010 period thereby providing greater flexibility in its resource planning.

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Q. HAS SCE&G CONDUCTED ANY SIMILAR STUDIES WITH RESPECT TO ITS PROJECTED ENERGY GROWTH?

The Company originally projected retail energy sales to grow at a rate of 2.1% per year over the next fifteen years compared to a historical growth of 2.4% per year over the prior fifteen years. A portion of this lower growth can be attributed to the mandated increase in efficiency for space conditioning units. The mandated minimal seasonal energy efficiency rating ("SEER") was recently increased from 10 to 13, a 30% increase in efficiency. The Company's forecast reflects efficiency increases anticipated to result from the passage of legislation mandating minimum SEER ratings. Subsequently, in December 2007, the United States Congress passed the Energy Security and Independence Act of 2007 ("ESAI"). This legislation concerns the overall energy policy of the United States and, among other things, will have a significant impact on energy growth through its efficiency standard on residential and commercial light bulbs. Although the impact of this law is not certain, SCE&G has made a significant reduction to its forecasted retail sales to reflect the mandated increases in the energy efficiency of light bulbs, including a doubling of current energy efficiency by 2020. After adjusting for the impact of this law, the Company's projected growth in retail sales is 1.7%

per year. Unlike retail sales, territorial sales include sales to full requirements wholesale customers. In comparison to total territorial sales growth, the Company is expected to experience a more marked drop in growth due to the expected loss of SCE&G's three largest wholesale customers. Based on these factors and as more fully described in **Exhibit No.** ____ (JML-4), the Company currently projects that over the next fifteen years, its territorial energy sales will grow approximately 1.3% per year.

A.

Q. PLEASE EXPLAIN HOW THE ESAI LEGISLATION IMPACTS THE COMPANY'S ENERGY SALES.

The ESAI legislation sets forth many requirements which will likely have an impact on energy sales nationwide. The most significant provision of the legislation with respect to energy consumption mandates an increase in the efficiency of light bulbs which effectively prohibits the continued manufacturing of most of the incandescent light bulbs produced today. For example, by 2012, a 100 watt incandescent bulb produced today must produce the same amount of lumens while consuming only 72 watts, or increase its efficiency by 28%. By 2013, 75 watt bulbs must also be 28% more efficient producing the same amount of lumens while consuming only 54 watts. A 60 watt bulb must meet the same efficiency standards by the year 2014. By contrast, compact fluorescent bulbs ("CFLs") produced today are about 73%

more efficient than incandescent bulbs and already meet the efficiency requirements of the law.

On average, approximately 15% of the energy consumed by a residential customer is for home lighting. A 73% reduction in lighting energy through the use of CFLs would correlate to approximately an 11% reduction (73% x 15%) in total residential electric consumption. Approximately 24.6% of the energy consumed by the average commercial customer is used for lighting; however, because commercial facilities are already larger users of fluorescent bulbs, the Company projects that ESAI will only increase commercial customer efficiency by 8%. Thus, for the average commercial customer SCE&G projects that total consumption will decrease approximately 2% (24.6% x 8%).

14 Q. TAKING THESE ISSUES INTO ACCOUNT, WHAT IS THE 15 PROJECTED LOAD THAT SCE&G WILL BE REQUIRED TO SERVE 16 IN 2016?

As shown on **Exhibit No.** ___ (**JML-3**), the Company projects that its firm summer peak demand in 2016 will be 5,582 MW.

20 Q. WHAT IS THE CURRENT SUPPLY CAPACITY OF SCE&G?

As shown in **Exhibit G** (**Exhibit No.** ___ (**JML-1**)), Page 2 of 3, SCE&G's total supply resource capacity is currently 5,745 MW.

Q. WILL THIS AMOUNT OF GENERATING CAPACITY MEET THE NEEDS OF SCE&G'S CUSTOMERS AND SYSTEM THROUGH 2016?

No, it will not. **Exhibit G** (**Exhibit No.** ____ (**JML-1**)), Page 1 of 3, contains the Company's peak demand forecast and the projected supply shortfall. Without additional capacity either through purchase or self-built generation facilities, SCE&G's reserve margin will decline below the Company's minimum target range of twelve percent (12%) and fall to an unacceptable two percent (2%) by 2016.

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Q. WHAT IS SCE&G'S PLANNING RESERVE MARGIN TARGET AND HOW DOES IT AFFECT THE NEED FOR CAPACITY?

The Company provides for the reliability of its electric service by maintaining an adequate reserve margin of supply capacity. SCE&G has historically maintained a planning reserve margin target of 12-18% of firm peak demand. However, the Company has exceeded this range in some periods when large new generation has been added to its system. This range of reserves allows SCE&G to have adequate daily operating reserves and to have reserves to cover two primary sources of risk: supply side risk and demand side risk. Supply side risk refers to the risk of some generating capacity being down-rated or forced offline. Demand side risk refers to the risk of experiencing higher loads than expected because of abnormal weather or forecast error. As a member of the Virginia-Carolina ("VACAR") subregion of the Southeast

Reliability Council, SCE&G's level of daily operating reserves is dictated by operating agreements with other VACAR member companies. VACAR has set the region's reserve needs at 150% of the largest unit in the region. SCE&G's pro rata share of this capacity for 2008 is approximately 200 MW. Taking these risks and needs into account, SCE&G must maintain a minimum reserve of 12% of its firm peak demand to reliably serve its customers.

8 Q. WHAT TYPES OF GENERATION HAS THE COMPANY 9 CONSIDERED TO MEET THESE NEEDS?

A. The Company primarily focused its analysis on seven types of generation facilities: solar, wind, landfill gas, biomass, natural gas, coal and nuclear.

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14 Q. WHAT WERE THE RESULTS OF THE COMPANY'S 15 CONSIDERATION OF SOLAR POWER?

The Company's analysis of solar power concluded that the necessary facilities are simply too expensive to construct. Photovoltaic systems cost about \$4,000-\$6,000 per KW and a solar thermal power plant would cost about \$3,600 per KW. Additionally, in South Carolina, solar power will only achieve a low-capacity factor of approximately 15-20%. While there is no fuel cost involved with solar energy, the amount of energy produced by the plant would not be sufficient to overcome the very high capital costs.

In addition to these significant limitations, solar power is not dispatchable. The energy output of the plant is wholly dependent upon energy from the sun and the hourly profile of the sun's energy throughout the day is not a perfect match to the hourly profile of SCE&G's load. In particular the sun shines strongest in the summer around noon and 1pm. But in the summer SCE&G always peaks after 2pm and before 6pm with the peak occurring after 4pm about 60% of the time. After 4pm a solar panel will only generate about 20% of its rated capacity thus significantly impacting the capacity of the plant when it would be needed most.

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DOES SCE&G CURRENTLY RECEIVE ANY OF ITS ENERGY SUPPLY FROM SOLAR PANELS ON ITS SYSTEM?

The Company is purchasing power from three customers on the system who have installed solar panels. In addition to payments through the Company's small power producers rate, these customers are subsidized by federal and state tax incentives and to some extent by payments from the Palmetto Clean Energy organization.

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Q. DOES THE COMPANY CONSIDER WIND POWER TO BE A VIABLE OPTION FOR ELECTRIC GENERATION IN SOUTH CAROLINA?

Unfortunately, no. Current wind turbine technology requires average wind speeds of approximately 7.5 meters/second ("m/s") to operate and about

12-14 m/s to reach maximum power output. As demonstrated by **Exhibit No.** ____ (JML-5) which contains a wind speed chart for South Carolina produced for the South Carolina Energy Office by AWS Truewind Company, on-shore wind in the state averages less than 5.5 m/s and does not have sufficient strength to make wind a feasible option.

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Q. 7 IF IT IS SO DIFFICULT TO GENERATE ELECTRICITY WITH WIND 8 TURBINES, WHY IS WIND POWER BEING ADDED ELSEWHERE IN 9

THE COUNTRY?

Wind power is being added in other regions of the United States primarily because certain states have mandated its installation whether economical or not and secondarily because the wind blows strong enough in some regions to make wind feasible. For example, Texas generates more capacity from wind power than any other state with about 4,300 MWs; however, Texas's wind speeds average around 6.4-8.8 m/s. Similarly, California, which is second to Texas in the amount of wind capacity in the country, has average wind speeds of around 8.0-8.8 m/s.

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Q. ARE THERE OTHER DRAWBACKS TO WIND POWER?

Like solar power, a wind power plant is not dispatchable nor is its capacity dependable since power can only be produced when the wind is blowing at a sufficient speed – when the wind stops blowing, the generation of power stops. For example, in California on the peak day of July 24, 2006, 2,500 MWs of possible wind capacity was only able to produce 255 MWs of power, or approximately 10% of rated capacity, due to a drop in wind speeds. Also, in Texas on February 26, 2008, the wind abruptly stopped and, just as abruptly, the Electric Reliability Council of Texas ("ERCOT") lost 1,700 MWs of generation. To maintain the transmission grid and serve the load, ERCOT had to scramble to interrupt customers, call on other DSM measures and start backup generators.

Because of these limitations, about 90% of the capacity from a wind farm is typically backed up with some other form of generation such as quick start peaking turbines. Additionally, the lack of dependability of these systems means that only 10% of the capacity of a wind power plant is considered firm capacity. In other words, a 1,000 KW wind farm might require about 900 KWs of gas fired combustion turbine capacity to backstand the wind capacity.

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YOU STATED EARLIER THAT SOUTH CAROLINA HAD INSUFFICIENT ON-SHORE WINDS TO MAKE WIND POWER FEASIBLE. DID SCE&G CONSIDER OFF-SHORE WIND POWER?

The Company certainly considered this alternative and recognizes that the wind blows more dependably off-shore than on-shore. However, SCE&G does not currently consider off-shore wind power a commercially viable technology because of the uncertainty related not only to the wind

characteristics but also to the cost of building and maintaining a power plant off-shore along with the related transmission facilities needed to bring the power back to the Company's system. Moreover, the Company is not aware of any utility that has installed off-shore wind turbines in areas prone to be impacted by hurricanes. Because of so much uncertainty, the considerable cost of this technology and the fact that off-shore wind power is expected to achieve only a 30%-35% capacity factor, the Company believes it prudent to forego this technology for the time being.

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Q. WOULD LANDFILL GAS PLANTS BE ECONOMICAL ON THE SCE&G SYSTEM?

Based on the Company's estimates of cost, SCE&G expects that landfill gas plants would be economical to employ on its system; however, these facilities are very small, typically producing only about 5 to 10 MWs per plant.

A.

Q. DOES SCE&G EXPECT TO ADD THIS TYPE OF CAPACITY IN THE FUTURE?

The Company is certainly looking into this possibility; however, the potential is very limited and many of the best locations in the state have already been captured by Santee Cooper, which currently has 4 sites producing a total of about 25 MWs.

1 Q. IS THERE ENOUGH CAPACITY FROM LANDFILL GAS IN THE STATE TO AFFECT YOUR NUCLEAR DECISION? 2

A. No, there is not enough landfill capacity in the state to replace the 3 4 nuclear capacity that we are planning to add.

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6 Q. IS BIOMASS A REASONABLE ALTERNATIVE FOR GENERATING 7 **CAPACITY?**

The economic feasibility of a biomass facility is very site specific and circumstance specific. Therefore, there may be opportunities for a biomass facility that would be cost-effective on the SCE&G system. In fact, SCE&G operates a 90 MW plant at its Cogen South facility which generates about 50% of its energy from biomass fuel generated by waste from a paper manufacturing facility. However, biomass power is typically not economically competitive with more traditional sources of power. The construction cost of a typical biomass plant averages approximately \$2,700 per KW with a heat rate of 13,000 for the typical biomass plant. At this level of cost, biomass is simply not competitive with alternative forms of generation.

Q. IF SCE&G 18 WERE **PRESENTED** WITH **ACCEPTABLE** OPPORTUNITIES WHICH WOULD MAKE BIOMASS A FEASIBLE 19 ALTERNATIVE, MIGHT THAT ELIMINATE THE NEED FOR THE 20 PROPOSED NUCLEAR PLANTS?

No, not at all. There is simply not enough realistic potential biomass capacity available to eliminate the need for the nuclear plants. In fact, the consultant group La Capra Associates recently performed a feasibility study for Central Electric Cooperative and concluded that biomass generation could realistically produce approximately 491 MWs in South Carolina, consisting of 423 MWs from wood waste and 68 MWs from agricultural by-products. Because SCE&G serves about 27% of the state, the Company estimates that approximately 132 MWs of biomass generation potential exists in its service territory. If SCE&G is able to take advantage of all of this potential, the Company could easily incorporate the 132 MW of power in its resource plan and displace some of the purchased power contracts in the resource plan. The need for the two nuclear units would be unaffected.

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Q. ARE THE LA CAPRA STUDY RESULTS REASONABLE?

Yes, I believe they are. La Capra Associates is very experienced in these types of studies having conducted their analysis in several states throughout the country, including North Carolina. A group of SCE&G's managers and engineers were able to discuss the study results in depth with the principal investigator for the La Capra study. Further, Clemson University performed a similar potentiality study for biomass which also estimated the realistic biomass potential in South Carolina to be about 400 MWs. These

circumstances lead SCE&G to believe that the results and findings of the study are reasonable.

Q. HAS SCE&G TAKEN ANY STEPS IN AN ATTEMPT TO REDUCE DEMAND SUCH THAT ADDITIONAL CAPACITY WOULD NOT BE NECESSARY?

Yes. SCE&G, like all utilities, operates a collection of Demand Side Management ("DSM") programs. There are two types of DSM programs. The first type comes under the heading of demand response ("DR") programs which are designed to lower peak demands and move consumption out of peak periods. The second type are energy efficiency ("EE") programs which are designed to lower energy consumption in general and not directly during peak periods.

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Q. PLEASE EXPLAIN SCE&G'S DEMAND RESPONSE PROGRAMS.

SCE&G has been very successful with its DR programs. Through its interruptible load program and its standby generation program, SCE&G has been able to reduce its firm demand by approximately 4% thereby avoiding the need for more than 200 MWs of peaking capacity in its resource plan. Additionally, SCE&G provides time of use ("TOU") rates to all its customers and Real Time Pricing ("RTP") rates to large customers, both of which offer lower prices during off-peak periods thereby providing the opportunity for

customers to save money by moving consumption out of peak periods. Finally, SCE&G derives DSM benefits from its Fairfield Pumped Storage Facility which operates like a giant battery, storing low cost power at night and releasing it during the day. Fairfield can effectively shift up to 576 MWs of peak load to off-peak generation. This benefit is more fully described in **Exhibit H (Exhibit No.** ___ (JML-2)), Page 6 of 11, which shows Fairfield's impact on SCE&G's average weekday load profile.

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Q. ARE THERE REASONABLE OPPORTUNITIES FOR SCE&G TO EXPAND ITS DEMAND RESPONSE EFFORTS?

Except for a modest increase in the standby generator program designed to bring it to a more significant level for dispatching, the answer is no. SCE&G has effectively reached the maximum limit for useful demand response for several reasons:

1. SCE&G's demand response capacity represents approximately 4% of its firm peak. As shown in **Exhibit H** (**Exhibit No.** ____ (**JML-2**)), Page 5 of 11, the average around the country is between 2% and 3%. Florida, which has a response capacity of approximately 6%, is the main exception to this rule because they have a very spiked peak in winter when electric strip space heating and water heaters come on in the morning.

2. SCE&G currently has about 200 MWs of demand response capability. An additional 100 MWs of such capability would fall lower on the Company's load duration curve and would, therefore, have to be operational for two weeks or more. SCE&G believes that this would place a significant strain on participating customers such that they would not be willing to continue participating in the long term.

- 3. SCE&G attempts to run the system at the low end of its reserve margin range, 12%, in order to keep its rates as low as possible.

 A DR program is typically less reliable than generating capacity and, with reserves so low, SCE&G would not be comfortable replacing additional capacity with demand response. For example, utilities in Florida are required to maintain a 20% reserve margin. If SCE&G maintained a 20% planning reserve margin, then a 6% level of demand response or more, like in Florida, would be reasonable.
- 4. Reserve capacity is low not only during hot summer afternoons and cold winter mornings but also during the spring and fall when plants are taken out of service for maintenance. These conditions would place additional stress on customers participating in a new DR program which SCE&G does not think they will bear in the long run.

1 5. Finally, the Saluda Hydro facility is a valuable part of the 2 Company's generating fleet providing 206 MWs of capacity to 3 our system. This facility is held in reserve to support system reliability and fulfill the Company's commitment to VACAR. 4 5 Similarly, because demand response programs interrupt service to customers, these programs are also used to support system 6 reliability and meet the Company's commitment to VACAR. 7 8 When these resources are combined, they represent almost two-9 thirds of our planning reserves. SCE&G believes that adding significantly more demand response capability would increase 10 11 this ratio beyond a tolerable limit.

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13 Q. DISCUSS SCE&G'S ENERGY EFFICIENCY PROGRAMS.

14 A. The Company has two categories of energy efficiency programs:
15 Customer Information Programs and Energy Conservation Programs. The
16 Customer Information Programs include:

• The Annual Energy Campaign: Each year SCE&G takes steps to educate its customers on energy efficiency by distributing brochures and printed materials containing energy tips; bill inserts targeting low income customers; weatherization projects to help low income customers; news releases; direct mailing of

our Energy Wise Newsletter; and a significant amount of online literature and home project videos.

WEB-Based Information and Services Programs: As with the Annual Energy Campaign, this program makes available literature and recommendations but also provides the customer with the ability to analyze individual consumption patterns and the impact weather has on the cost of electricity. Additionally, this program allows customers to perform online home audits.

SCE&G's Energy Conservation Programs include the Value Visit Program which provides expert advice to residential customers considering upgrading their home's energy efficiency. This assistance can be obtained through home visits, telephone conversations or email correspondence. The program also provides financial assistance to help offset the cost of added insulation, storm windows or certain other measures.

Q. HAVE THESE DSM PROGRAMS PROVEN TO BE SUCCESSFUL?

- A. Yes they have. We look at the following measures of success:
 - The demand response component has reached its useful limit of more than 200 MWs.
 - About 174,000 customers are registered for WEB access.
 - Almost 97,000 customers accessed the "Energy Analyzer" tool in 2007.

1		• Over 50,000 residential customers receive service on the Energy
2		Conservation Rate.
3		• About 20% of commercial consumption is provided under our TOU or
4		RTP rates.
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6	Q.	DOES SCE&G PLAN TO EXPAND ITS PORTFOLIO OF
7		PROGRAMS?
8	A.	Yes it does. SCE&G recently took an important step to expand these
9		offerings by establishing a Department for DSM and appointing a Director to
10		manage the revitalization of the Company's energy efficiency efforts. The
11		Company has taken additional steps such as the following:
12		The hiring of additional energy auditors to perform residential
13		audits.
14		The addition to the Company's website of an online energy audit
15		program to allow customers to analyze various factors which
16		impact their consumption and to explore the benefits of energy
17		efficiency.
18		A survey of customers to determine what programs might interest
19		them and which they would support.
20		The purchase of a South Carolina Library of DSM Measures
21		containing an estimated KW and KWH impact of various

1		residential and commercial efficiency measures which will be
2		the building blocks for any energy efficiency programs.
3		• The retention of a consulting firm with expertise in the area of
4		energy efficiency and in the estimation of its potential on a
5		utility system.
6		SCE&G plans to use these tools to develop a comprehensive and effective
7		portfolio of energy efficiency options for its customers.
8		
9	Q.	IS IT POSSIBLE THAT YOUR EXPANDED ENERGY EFFICIENCY
10		EFFORTS MIGHT AFFECT SCE&G'S DECISION TO BUILD TWO
11		NUCLEAR PLANTS?
12	A.	No, they would not for many reasons, including the following:
13		• The impact of the Company's future efforts are not known. For
14		the nuclear facilities to be in service as planned, SCE&G needs
15		to begin the process now to ensure that this capacity is available
16		when needed to reliably serve its current and future electric
17		customers.
18		Based on the Company's experience with prior energy efficiency
19		programs such as the Great Appliance Trade-Up Program, the
20		Good Cents Program and Energy Audits, these tools, while
21		helpful, may not be enough to overcome the trend toward more
22		electrification and customer use may continue to increase.

- While energy efficiency programs place downward pressure on customer use, new end uses such as plasma TVs and electronic billboards may overcome these gains.
- Much of the growth in energy results from new customers as opposed to an increase in consumption by existing customers.
 For example residential consumption increased by 39% over the last 10 years while consumption per customer increased by only 9%. Thus about 75% of the energy growth in the residential sector is the result of customer growth. Similar results hold for the commercial sector.
- If the Company's energy efficiency programs are exceptionally effective and energy demand drops significantly, SCE&G would be able to use the new nuclear capacity to reduce its reliance on fossil fuels by avoiding the use of its peaking facilities and perhaps may be able to retire one or more of its aging coal plants without replacing the base load capacity.

A.

Q. DID THE COMPANY ANALYZE THE REASONABLENESS OF MORE TRADITIONAL GENERATION SOLUTIONS?

Since SCE&G's increased DSM efforts and the potential for renewable power will have only a limited impact on the need for capacity, SCE&G considered traditional sources of power such as gas, coal and nuclear. The

nuclear strategy centered on adding nuclear plants in 2016 and 2019 and adding purchased power capacity and combustion turbine peaking capacity in various years to maintain a minimum reserve margin of 12%. The coal plan was developed by replacing the two nuclear plants with two coal plants of about the same size. Several gas plans were considered. One involved adding only peaking capacity and the others involved adding one, two or three combined cycle plants along with a mix of purchased power contracts and peaking turbines to maintain minimum reserves. The least cost of these gas plans included three combined cycle units.

Q.

A.

WERE YEARS OTHER THAN 2016 AND 2019 CONSIDERED FOR THE NUCLEAR STRATEGY?

No. Year 2016 was chosen because it is the earliest that a nuclear plant can be built and become operational. Originally, SCE&G thought that it might be feasible to have a plant in operation by 2015; however, that goal is not likely to be attainable. SCE&G has scheduled construction on the second nuclear plant so as to allow more load growth to occur while not losing the considerable benefit in economies of construction of two plants. Further, because there are only a few companies in the world that are qualified to construct these facilities and many other utilities are currently planning nuclear construction, postponing the construction of the plants beyond this time frame could result in SCE&G losing its current position in the order of construction

which could potentially delay the project for several years. This delay would also result in the Company potentially losing the benefit of federal production tax credits and facing higher costs due to rising construction prices.

A.

Q. PLEASE SUMMARIZE THE RESULTS OF THE ECONOMIC ANALYSIS.

Exhibit H (Exhibit No. ____ (JML-2)), Page 9 of 11 through Page 10 of 11, contains summary results for nine key scenarios developed by SCE&G in considering gas, coal and nuclear generation. The Company calculated the revenue requirements under each scenario for the 40-year planning horizon. Revenue requirements included the total system production costs and the capital costs for all incremental capacity. The only costs SCE&G excluded from these analyses were sunk costs, such as the capital costs of existing generating units, which would be equal under all scenarios. Additionally, the Company calculated the levelized present worth of each annual stream of revenue requirements and determined the difference in levelized present worth between the nuclear strategy and the alternative strategies under each scenario.

For example, the Company initially determined a "base case" scenario which assumed that CO2 emission allowances would be required and would cost \$15 per ton in 2012 escalating at 7% per year. As shown in Column 1 of the first table on Page 9 of 11 of **Exhibit H** (**Exhibit No.** ____ (**JML-2**)), following the best gas expansion strategy under these circumstances would

cost customers on average \$15.1 million per year more than the nuclear strategy and the coal strategy would cost \$94.9 million more. If CO2 allowances were to cost \$30 per ton as assumed in Column 2 of this table, the cost of the gas strategy would exceed the cost of the nuclear strategy by \$125.2 million per year and the cost of coal strategy would increase costs by \$267.5 million per year. Similarly, Column 3 of this table shows the Company's analysis of higher natural gas prices with the gas strategy increasing costs by \$68.5 million and the coal strategy by \$99.0 million.

As shown in the second table on Page 9 of 11 of **Exhibit H** (**Exhibit No.** ___ (**JML-2**)), SCE&G also performed an analysis which assumed high uranium prices, low gas prices and no CO2 regulation. Even with high uranium prices, the nuclear strategy is still less costly and only under the scenarios of low gas prices or no CO2 regulation would the gas strategy or coal strategy be less expensive for our customers as shown in this table.

Lastly, the scenarios in the first table on Page 10 of 11 of Exhibit H (Exhibit No. ___ (JML-2)) were studied to show that by adding these nuclear facilities, the Company will be in a much better position to retire some of its aging base load coal plants and to protect our customers from high fuel prices. This table compares the impact of three possible coal retirement scenarios. The "High Forced Outage Rate" scenario in Column 1 assumes that SCE&G will continue to operate all of its coal plants regardless of age; however, these plants will become more unreliable with time. The "Retire Small Coal Plants"

scenario in Column 2 envisions the need for more environmental investment at each plant such as the need to add carbon capture equipment. This type of investment is not likely to be economical at smaller coal plants. Finally, the "Retire All Coal When 60 Years Old" scenario in Column 3 is self-explanatory. All three scenarios represent future possibilities. As shown in the table, SCE&G is better able to protect its customers under these scenarios if it pursues the nuclear strategy.

A.

Q. HAS THE COMPANY STUDIED THE POTENTIAL IMPACT OF ITS NEW DSM EFFORTS ON THE NEED FOR THE NUCLEAR FACILITIES?

Yes, we have. Company witness David Pickles will show that in warm weather states like South Carolina, active DSM programs average a 0.36% reduction in total system retail energy sales annually. Nationally, Mr. Pickles testifies that active DSM programs experience an average of a little more than 0.5% in annual energy sales reductions.

Based on Mr. Pickles' information, I have sought to measure the potential results of energy sales reductions at these levels on SCE&G's capacity planning and on the decision to construct the new nuclear units. I assumed that DSM programs were formulated and rolled out in 2009, implemented in 2009-2010, and that the full benefit from them was realized in 2011. I recomputed the models based on a 0.5% annual reduction in energy

sales growth for new DSM programs for twelve years and a levelized benefit thereafter.

Q. WHAT CONCLUSION DID YOU REACH?

5 A. Under the 0.5% assumption, the Company found that building new nuclear generation would still be the most economic strategy for meeting customers' needs.

A.

Q. WHAT TOTAL EFFICIENCY REDUCTIONS ARE REQUIRED?

As mentioned above, our forecast is already assuming approximately a 5% reduction in retail sales associated with the increased SEER rating for space conditioning and the increased efficiency in lighting in the 2011-2019 time period. Coupling these reductions which are already included in the forecast with an additional reduction in sales of 0.5% annually would result in a total reduction in sales due to efficiency measures that is well outside what I consider to be a reasonable range.

Q. WHY DID THE COMPANY ASSUME THAT CO2 EMISSION ALLOWANCES WOULD COST \$15 PER TON AND ESCALATE AT 7% PER YEAR?

A. SCE&G based its estimations on a 7% escalation in cost by assuming a 2% level of inflation plus a 5% adder. SCE&G also assumed an initial CO2

emissions cost of \$15 per ton which the Company believes underestimates the realistic emissions cost which will ultimately be mandated. SCE&G believes that when CO2 is regulated, the price of a CO2 allowance will escalate to a high enough level to actually affect a reduction in CO2 emissions. If the cost of CO2 allowances are set too low, there will be an economic incentive to simply pay the penalty and keep emitting CO2. Therefore, the Company believes that the cost estimates set forth in the second table on Page 10 of 11 of Exhibit H (Exhibit No. ___ (JML-2)) are much more realistic. However, even assuming the improbably low cost of \$15 per ton, SCE&G's analysis demonstrates that nuclear generation would be more advantageous. The table on Page 11 of 11 of Exhibit H (Exhibit No. ___ (JML-2)) shows the approximate impact on the levelized cost of the gas strategy relative to nuclear for various combinations of start cost and escalation.

A.

15 Q. WHAT WERE SCE&G'S PROJECTIONS FOR NATURAL GAS 16 PRICES?

For the commodity portion of gas price which is the majority of the cost, the Company relied on the prices of futures contracts trading on the NYMEX as of April 22, 2007. SCE&G's analysis of commodity prices, which represent the price of gas at the Henry Hub, used the trading price through 2010 and escalated the prices by 2.8%, which is slightly higher than inflation,

1		to estimate the cost beyond 2010. The Company added its transportation costs
2		to derive a delivered price for gas.
3		
4	Q.	COULD THE COMPANY'S PROJECTION OF GAS PRICES BE
5		HIGH?
6	A.	Yes, it could. Natural gas prices are notoriously difficult to predict
7		accurately. Since 1999, when gas prices began increasing more dramatically,
8		they have been growing by almost 15% per year. Although it is difficult to
9		know whether this trend will continue, it certainly highlights the risk to a utility
0		that depends too heavily on gas generation. Nevertheless, basing a forecast on
1		current levels of gas prices as reflected in the NYMEX futures contracts and
2		escalating at a rate a little above inflation is a reasonable and conservative
3		approach to the problem.
4		
5	Q.	HOW DID THE COMPANY PROJECT THE COST OF NUCLEAR
6		FUEL?
7	A.	SCE&G subscribes to the Ux Consulting Company, which analyzes the
8		nuclear fuels market and provides us with long-term projections of costs.
9		
20	Q.	DO YOU CONSIDER THESE PROJECTIONS OF FUEL COSTS TO BE
1		DEACONADI E?

Yes, I do.

22

A.

Q. PLEASE SUMMARIZE YOUR TESTIMONY.

2	A.	I conclude by saying that:
3		• The proposed nuclear facilities are the most economical form of
4		generation to add for the Company's system and its customers.
5		• The nuclear facilities meet the Company's need for additional
6		base load capacity.
7		• The nuclear facilities are non-emitting resources and therefore
8		serve to protect the environment while at the same time
9		mitigating exposure to the cost of complying with future
10		environmental regulations.
11		• The nuclear facilities support the need for fuel diversity in
12		SCE&G's capacity mix.
13		• Renewable power, increased demand side management and
14		potential energy efficiency gains are not capable of replacing the
15		need for more base load generation; however, they could support
16		SCE&G's expansion plan by displacing some of the purchased
17		power currently anticipated as well as reducing our dependence
18		on aging coal plants.
19		Based on consideration of these factors, SCE&G believes that constructing the
20		nuclear facilities is the most reasonable and prudent response to its need for
21		future base load capacity to serve its customers and the people of South
22		Carolina.

- 1 Q. DOES THIS CONCLUDE YOUR TESTIMONY?
- 2 A. Yes.